ABSTRACT

An optical measuring device generates a plurality of measured optical data from inspection of a thin film stack. The measured optical data group naturally into several domains. In turn the thin film parameters associated with the data fall into two categories: local and global. Local "genes" represent parameters that are associated with only one domain, while global genes represent parameters that are associated with multiple domains. A processor evolves models for the data associated with each domain, which models are compared to the measured data, and a "best fit" solution is provided as the result. Each model of theoretical data is represented by an underlying "genotype" which is an ordered set of the genes. For each domain a "population" of genotypes is evolved through the use of a genetic algorithm. The global genes are allowed to "migrate" among multiple domains during the evolution process. Each genotype has a fitness associated therewith based on how much the theoretical data predicted by the genotype differs from the measured data. During the evolution process, individual genotypes are selected based on fitness, then a genetic operation is performed on the selected genotypes to produce new genotypes. Multiple generations of genotypes are evolved until an acceptable solution is obtained or other termination criterion is satisfied.